WHAT IS CLAIMED IS:

1. A composition, comprising a siloxane resin having the formula:

$(HSiO_{3/2})_a(SiO_{4/2})_b(HSiX_{3/2})_c(SiX_{4/2})_d$,

wherein each X is independently -O-, -OH, or $-O-(CH_2)_m-Z_n$, provided at least one X is $-O-(CH_2)_m-Z_n$, wherein Z_n is a polycyclic aromatic hydrocarbon moiety comprising n aromatic rings, wherein each m is independently an integer from 1 to about 5, Z is an aromatic moiety, and each n is independently an integer from 1 to about 6;

$0 < a < 1$, $0 < b < 1$, $0 < c < 1$, $0 < d < 1$, and $a + b + c + d = 1$.

2. The composition of claim 1, wherein $0.3 \leq a \leq 0.7$, $0.3 \leq b \leq 0.7$, and $0 < (c + d) \leq 0.6$.

3. The composition of claim 1, wherein each X is independently -O-, -OH, or $-O-(CH_2)-Z_3$, provided at least one X is $-O-(CH_2)_m-Z_3$.

4. The composition of claim 3, wherein $-(CH_2)_m-Z_3$ is a 9-anthracene methylene moiety.

5. The composition of claim 1, further comprising an organic solvent.

6. The composition of claim 5, wherein the organic solvent is 2-ethoxyethanol, 1-methoxy-2-propanol, or propylene glycol monoether.

7. A method for preparing a dyed siloxane resin composition, comprising:

(i) reacting a trialkoxysilane, a tetraalkoxysilane, and water, in the presence of a hydrolysis catalyst, to form a first siloxane resin having $HSiO_{3/2}$, $SiO_{4/2}$, $HSiX'_{3/2}$, and $SiX'_{4/2}$ units, wherein X' is independently -O- or -OH, and having substantially no silicon-carbon bonds; and

(ii) reacting the first siloxane resin with a compound having the formula $HO-(CH_2)_m-Z_n$, wherein each m is independently an integer from 1 to about 5, Z is an aromatic moiety, and each n is independently an integer from 1 to about 6, to form the dyed siloxane resin composition.

8. The method of claim 7, wherein the hydrolysis catalyst is a base or an acid.

9. The method of claim 8, wherein the hydrolysis catalyst is a mineral acid.

10. The method of claim 7, wherein reacting step (ii) is performed at a temperature from about 25°C to about the boiling temperature of a reaction component and for a duration of about 10 min to about 60 min.

11. The method of claim 7, wherein reacting step (ii) is performed in the presence of a mineral acid.

12. The method of claim 7, wherein reacting steps (i) and (ii) are performed simultaneously.

13. A dyed siloxane resin composition, prepared by the method of claim 7.

14. A method of preparing an anti-reflective coating on a substrate, comprising:

(i) coating a composition onto a substrate to form a coated substrate, wherein the composition comprises a siloxane resin having the formula $(HSiO_{3/2})_a(SiO_{4/2})_b(HSiX_{3/2})_c(SiX_{4/2})_d$, wherein each X is independently -O-, -OH, or -O-$(CH_2)_m$-Z_n, provided at least one X is -O-$(CH_2)_m$-Z_n, wherein Z_n is a polycyclic aromatic hydrocarbon moiety comprising n aromatic rings, wherein each m is independently an integer from 1 to about 5, Z is an aromatic moiety, and each n is independently an integer from 1 to about 6; $0 < a < 1$, $0 < b < 1$, $0 < c < 1$, $0 < d < 1$, and $a + b + c + d = 1$; and

(ii) curing the coated substrate, to form the anti-reflective coating on the substrate.

15. The method of claim 14, wherein the curing step (ii) comprises heating the coated substrate at about 50°C to about 300°C for a duration of about 0.1 min to about 60 min.

16. The method of claim 15, wherein the curing step (ii) comprises heating the coated substrate at about 150°C to about 275°C for a duration of about 1 min to about 5 min.

17. The method of claim 15, wherein the curing step (ii) is performed under an inert atmosphere.

18. The method of claim 17, wherein the inert atmosphere consists essentially of nitrogen.

19. A semiconductor wafer, prepared according to the method of claim 14.